

# BMJ Open

## Let's talk about children evaluation (LTCE) study in northern Finland: A multiple group ecologic study of children's health promotion activities with a municipal and time-trend design

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-015985
Article Type:	Protocol
Date Submitted by the Author:	23-Jan-2017
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<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research, Epidemiology
Keywords:	children, youth, well-being, community-level intervention, ecologic study

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3 **Manuscript 10.01.2017**

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8 **children's health promotion activities with a municipal and time-trend design**  
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## Abstract

**Introduction:** To optimize children's health and development, Finland has called for settings approach and a change of direction in child and family services. The Let's Talk about Children (LTC) approach, brief psycho-educational discussions for parents with kindergarten- and school-age children, has been implemented across most Council of Oulu Region's municipalities over the past three years. This study protocol describes the Let's Talk about Children Evaluation (LTCE) Study, a community- and family-level intervention across 30 municipalities in northern Finland, the process of the renewal, and the methods used to evaluate its effectiveness in improving children's socio-emotional well-being.

**Methods and analysis:** A quasi-experimental ecologic study protocol will be implemented to evaluate whether universal LTC approach improves children's well-being. In each municipality, a series of actions will be conducted over periods of municipal engagement, training of personnel, and implementation of the LTC approach in all communal child and family services. Data collection consists of yearly online questionnaires for local management groups and retrievals from the population statistics and child welfare statistics of Finland. Child and family service data includes annual numbers of LTC discussions and LTC network meetings. Outcome measures include annual child welfare notifications, interventions and placements outside home, as well as referrals to child and young person psychiatric clinics during the years 2014 -2018.

**Ethics and dissemination:** The study design has been approved by the management of Oulu University Hospital according to the guidelines given by The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu, Finland. All data are treated and implemented according to national data security laws. Study findings will be disseminated to provincial and municipal partners, collaborative community groups and the development research community. The LTCE Study databases will guide future regional development action and policies.

### Strengths and limitations of this study

- The Let's Talk about Children Evaluation (LTCE) Study is study protocol is suitable in cases where the intervention is implemented year by year across real-life municipalities. By creating a regional database of Let's Talk about Children (LTC) results, we can sample more than 100 000 children and youth. There is high merit in large scale evaluations such as this.
- The LTC-approach seeks to better link community services provided to families and to assist families in accessing needed supports.
- An adequate measurement of an individual-level LTC-intervention is difficult, because the framework of strengths and vulnerabilities is underlying both the capacity of individuals and their social and physical ecologies.

### Introduction

Children's mental health problems disrupt healthy development and are among the leading causes of disability for children and youth. There are opportunities, however, to improve mental capital through different types of intervention. We can make efforts to build the cognitive and emotional resources that influence how well an individual is able to experience a high quality of life. On the other hand, the problems extend beyond an individual to family members and communities. Thus, system-wide changes and setting approach are needed [1, 2]. The emergence of a settings approach has been attributed to the Ottawa Charters (WHO, 1986) statement that health is created and lived by people within the settings of their everyday life. More research into system interventions is needed to produce evidence base to transform child and family services.

Many evidence-based interventions fail to take an ecologic perspective in order to achieve a population-level impact. Children's problems may develop as a result of problems within their families or communities and may include parental mental health problems, food and housing insecurity, or exposure to dangerous

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3 neighborhoods or challenging schools. Intervention may be more effective when directed to the underlying  
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5 issues and designed to fit the work flow and staffing of local child and family services [3]. Integration efforts  
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7 in Finland involve work with school-based and public health services. Health promoting activities will be  
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9 delivered in the context for co-occurring service conditions, and with a focus on individual and family  
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11 strengths and vulnerabilities.  
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14 A strategic approach to health promotion consist both vertical and horizontal actions. In this way strong  
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16 systems of local child and family services with universal delivery can be achieved. For the moment, service  
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18 systems are often expensive in terms of duplication, inefficiency, and high procurement costs [4]. In  
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20 developing child and family services, the challenges include the fragmentation of services, inter-sector  
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22 boards, different work cultures, and data transmission difficulties. Furthermore, the families have a wide  
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24 diversity of needs, as well as differences in obtaining assistance and advice.  
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28 In planning the present development program, the following framework was used to conceptualize the  
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30 integration of child and family services. Activity integration involves joint provision of intervention by  
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32 different sectors of services and joint training sessions for professionals. At regional level, policy integration  
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34 includes the development of a harmonized incentive structure for operationalizing the actions and a  
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36 formation of a new partnership for municipal-based delivery of child and family services. Furthermore,  
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38 capacity building includes strengthening the evaluation of health promotion activities among municipal  
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40 child and family services.  
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44 The present development program across the Council of Oulu Region is based on elements of brief psycho-  
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46 educational discussions with parents (Let's Talk about Children, LTC) [5]. LTC was developed for the  
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48 Effective Family Program and has been tested in real life mental health clinics to fit in the real life settings  
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50 of multi-professional child and family services [5-7]. In Finland, most children are happy with their lives. Not  
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52 all children, however, are getting the best possible start in life. Almost 10% of children live in jobless  
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54 households. Among secondary school aged children 4 % see their parents drunk on a weekly basis, 7 % of  
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56 children report being weekly bullied in school, and 8 % do not have close friends [8].  
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3 The objective of this paper is to describe the protocol of a quasi-experimental ecologic study with a  
4 municipal group and multiple time-series design. We will evaluate the effectiveness of a community level  
5 intervention across all public child and family services in 30 municipalities in in the Council of Oulu Region  
6 to promote socio-emotional well-being of children. The intervention will identify children's needs and  
7 provide support to them among broad spectrum of arenas in which support may be effective. The  
8 intervention is expected to produce positive aspects of child development and is impacted through changes  
9 to children's nearest social and physical ecologies. We intend to assess the associations between change in  
10 annual coverage of LTC actions and change in different outcome measures among age groups residing in  
11 urban and rural municipalities. The intervention is expected to improve children's well-being after each  
12 municipality implements the LTC activities in all child and family services. It is also anticipated that changes  
13 will be observed in incidents of emergency placement or taking into care of a child as well as incidents of  
14 new referrals to child or adolescent psychiatric unit.  
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## 30 **Methods and analysis**

### 31 **Design**

32 The present study is an ongoing quasi-experimental ecologic study, which is conducted in a naturalistic  
33 setting of public child and family services in the Council of Oulu Region, Finland. The study focuses on the  
34 population under the age of 18 years. We assess the ecologic association between the average LTC-  
35 intervention activity and the aggregated measurement of the rate of unwanted incidents among multiple  
36 children groups. The sources of data used involve observations of multiple groups based on place and time  
37 (Figure 1). The evaluation will consist of data collection at five time points (baseline and following each of  
38 the four data collection).  
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50 **Figure 1** Design of the present study. Blocks of municipalities represent group of intervention areas. Each  
51 time period (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention)  
52 represents one time period of one block of municipalities.  
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58 Insert Figure 1 in here  
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3 Since 2012, the LTC-services have been applied in prior municipalities. The training stage of LTC-  
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5 intervention among service suppliers was first conducted in the town of Raahe. During the study, the LTC-  
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7 intervention will be rolled out gradually to 30 municipalities (see participants below). The LTC intervention  
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9 activities will be branching out gradually year by year (Figure 2). The intervention will be fully implemented  
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11 by the end of the study, with all municipalities receiving the intervention.  
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14 **Figure 2** Data collection timeline for the Let's talk about the children evaluation study.  
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17 Insert Figure 2 in here  
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### 23 **Participants**

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25 "Change now. Let's talk about the children at the Council of Oulu Region" program is coordinated by the  
26  
27 Northern Ostrobothnia Hospital District. The program was planned both at regional and local levels within  
28  
29 regional offices, local public sector offices, non-governmental organizations, and other regional partners.  
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31 The program coordinators will operate in order to guide the activities at local level. At local level, the  
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33 integration will be conducted among the implementers, including municipal employees and relevant  
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35 community-based partners. Interventions will be made in early childhood education in primary school, and  
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37 in secondary school as well as in all health and social services.  
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41 The evaluation study is being conducted by the Oulu University Hospital in close liaison with the University  
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43 of Oulu and the University of Lapland. The Oulu University Hospital received circa 250,000 € funding for the  
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45 implementation of LTC services from member municipalities of the Northern Ostrobothnia Hospital District  
46  
47 and the Council of Oulu Region (European Regional Development Fund). The hospital district consists of 30  
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49 distinct municipalities, of which three are urban (Kempele, Oulu and Raahe), five are rural close to urban  
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51 areas (Ii, Liminka, Lumijoki, Siikajoki and Tyrnävä), 10 are core rural (Haapajärvi, Haapavesi, Kalajoki,  
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53 Muhos, Nivala, Oulainen, Pyhäjoki, Reisjärvi, Sievi and Ylivieska) and 12 are sparsely populated rural  
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55 (Alavieska, Hailuoto, Kuusamo, Kärsämäki, Merijärvi, Pudasjärvi, Pyhäjärvi, Pyhäntä, Siikalatva, Taivalkoski,  
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3 Utajärvi and Vaala). The classification of municipalities will be described further in context with statistical  
4 analyses.  
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### 7 8 **Multiple children groups by citizenship** 9

10 Complete numbers of children and young people are retrieved from the Population Statistics (Statistics  
11 Finland) and the numbers are sorted by municipalities of the Council of Oulu Region. Population data by  
12 age group gives the municipality's permanent resident population in each age group on the last day of the  
13 year. The multiple age groups evaluated in the study are 0-6-year-olds, 7-16-year-olds, and 0-22-year-olds.  
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15 A description of the multiple groups and measures used in the data collection is reported in Table 1.  
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**Table 1.** A description of study population and measures used in the data collection, year 2013.

Area	Population*		Child welfare actions			Psychiatric referrals		
			Notificatio n**	Intervention ***	Placement ****	Home help <sup>s</sup>		
	aged 0 - 9 n	10 - 19 n	aged 0-17 n	0 - 17 n	0 - 17 n		0-17 n	13-22 n
Alavieska	348	406	65	48	7	0		5
Haapajärvi	1020	1106	132	190	21	20	8	12
Haapavesi	976	1065	77	108	18	0	3	4
Hailuoto	80	87	19	11	0	0		1
Ilveskoski	1584	1311	161	209	7	19	11	5
Kalajoki	1647	1605	125	66	21	8	1	1
Kempele	2852	2496	428	264	32	54	19	9
Kuusamo	1649	1887	137	233	49	89	3	7
Kärsämäki	323	367	47	97	12	9	2	1
Liminka	2351	1708	248	120	10	31	11	7
Lumijoki	435	324	46	126		14		3
Merijärvi	178	179	13	8	0	0		
Muhos	1550	1361	165	127	20	52	8	9
Nivala	1803	1606	284	275	34	0	6	6
Oulainen	999	1078	164	106	19	0	6	3
Oulu	26476	23337	4822	3719	672	860	110	105
Pudasjärvi	890	1036	103	121	21	0	4	3
Pyhäjoki	408	406	64	36		6	7	
Pyhäjärvi	574	587	107	123	16	6	3	2
Pyhäntä	211	234	25	7		0		4
Raahe	3354	3183	570	321	80	60	19	12
Reisjärvi	380	404	76	59	8	9		
Sievi	952	911	122	132	13	0	1	3
Siikajoki	848	790	136	83	20	10	8	3
Siikalatva	613	677	62	74	10	0	4	5
Taivalkoski	438	552	46	40	17	0	2	3
Tyrnävä	1562	1076	156	139	9	1	3	6
Utajärvi	319	360	48	82	10	0	5	2
Vaala	254	365	117	59	17	22	7	6
Ylivieska	2182	1869	290	326	39	0	7	12
<b>Total</b>	<b>57256</b>	<b>52373</b>	<b>8855</b>	<b>7309</b>	<b>1182</b>	<b>1270</b>	<b>258</b>	<b>239</b>

\* Population by age group, year-end total

\*\* The numbers of child welfare notifications

\*\*\* The numbers of child welfare interventions and in community care

\*\*\*\* The numbers of placements outside the home.

<sup>s</sup> Home help, recipient families with children**Intervention**

The primary objective of the Let's Talk about Children intervention is to prevent mental health problems of children and adolescents. We aim to promote health by making changes in modifiable risk conditions as

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3 well as bringing supportive changes in attributes that help children grow and develop successfully. At  
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5 system level, LTC development program also devotes resources to changing the regional child and family  
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7 health promotion delivery system, building the capacity of that system to maintain LTC activities and to  
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9 catch risk conditions before they get worse. The intervention will then provide resources and support to  
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11 initiate local activity program, ultimately aiming for the LTC discussions and network meetings to become  
12  
13 self-sustaining over time.

14  
15  
16 At local level, the intervention will be implemented and coordinated by a Local Management Team (LMT).

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18 The LMT includes managers of early childhood education, primary school, health services and social  
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20 services. Each LMT is responsible for implementing the LTC interventions in the child and family services of  
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22 the municipality. It is necessary to have different LMT for each area due to the large number of service  
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24 units (kindergartens, schools, health and social care centers), and because the units are spread across the  
25  
26 whole county. No one LMT is of sufficient size to cover the whole county.

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28  
29 Each municipality will receive a “municipal engagement phase” for four months prior to the local trainers’  
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31 training (Figure 2). During this phase, the LMT will engage with the elected member structures, schools and  
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33 other units in the LTC intervention activities. The program will then deliver the trainers’ training sessions of  
34  
35 LTC discussion and network meeting. These training sessions will be subsidized using program resources.  
36  
37 The LMT will coordinate trainers’ training by finding suitable participants. Furthermore, the LMT will  
38  
39 advertise the LTC activities using local media (e.g., newspapers, posters and leaflets). The local trainers will  
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41 all deliver training sessions of LTC discussions for their colleagues in the units of ongoing municipal child  
42  
43 and family services.

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46 Each LMT is given strategic support as well as a clear framework and timescales around the assessment of  
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48 the local activities and outcomes. The Oulu University Hospital will coordinate year by year the intervention  
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50 activities led by the LMT. Furthermore, appropriate specialist support and mentoring will be provided to  
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52 help the LMT in collecting data and sustaining the local units in their LTC intervention activities. All the  
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54 LMTs are responsible for the implementation and continuity of the universal LTC activities with the parents.  
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3 At family level, the intervention will include provision of universal LTC discussion for parents and LTC  
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5 network meeting for parents wanting to have support.  
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### 8 ***The LTC discussion***

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10 This parent-focused method has been described earlier [9]. Briefly, the aim of the LTC discussion is to help  
11  
12 parents recognize their children's strengths and vulnerabilities and to inform parents of ways to support  
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14 their children in spite of any problem in the family. The LTC discussion consists of one or two sessions with  
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16 the parent or with both of the parents. It is carried out with the child's own teacher, nurse or social worker.  
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18 The LTC manuals in Finnish are available in the internet for use in early childhood education, in primary  
19  
20 school, in secondary school as well as in all health and social services [9].  
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23  
24 When parents take up any problem the family is currently facing, for example poverty, unemployment and  
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26 housing problems, there is an option for a further network meeting. With approval by the parents the  
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28 meeting will be organized with those partners who are expected to be able to help the family.  
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### 31 ***The LTC network meeting***

32  
33 The LTC network meeting has been designed to respond to the different needs of the family on an ecologic  
34  
35 base. Depending on the needs, representatives of services as well as the family's own network are invited  
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37 in the meeting. The aim of the LTC network meeting is to activate all participants to provide support to the  
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39 child and family. The meeting offers a joint action forum for the aid and social support that is needed [10].  
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43 In order to implement LTC activities one has to start by measuring it. On each municipality, the intervention  
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45 will include measures on operational data of LTC discussions and LTC network meetings. From 2015  
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47 onwards, aggregated counts of LTC discussions and network meetings are obtained from each municipality  
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49 of the Council of Oulu Region. We use a time-series design to compare years under different LTC-  
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51 intervention intensity among age groups of 0-6 years, 7-16 years and 0-22 years.  
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### Outcome measurement

We assess children's unwanted outcomes based on populations defined both geographically and temporally. Outcome measurements are averaged for the populations in each geographical or temporal unit and then compared using standard statistical methods. The primary analysis will compare the proportion of children referred to child welfare services between different intensity of LTC activities. Furthermore, the proportion of children referred to psychiatric clinics will be analyzed respectively. Secondary outcomes will be the proportion of children who report experiences of being in moderate or poor health, having experiences of inadequate parenting, moderate or severe anxiety, difficulties to talk to parents and feelings that teachers are not interested in how the pupil is doing.

### Data sources

The follow-up of child and family service development will include items on commitment made by local organization, local management groups, trainers' training and local training of personnel. Program maintenance and sustainability will include items on how LTC activities are adopted into the regular activity of all child and family services and how LTC activities are maintained by local organizations. Problem-solving capability includes how to tackle children's health issues as an activity in its own and how participants work together in planning actions.

Online questionnaires will be sent out by e-mail to each local management group once a year, in January, and the respondents fill in the questionnaire themselves. Additional request are made until data from each participating municipality have been received. Then, the intervention phase (control phase, training and implementing phase, and constant actions) is recorded for each municipality at baseline and after each of the four following intervention periods i.e. calendar years.

In Finland, the municipalities are obliged to collect and report the child welfare data. Each year, the municipalities are sent a data request form where they are requested, within specified time, to log in the Lasu-Netti website and check the provided list of current placements, record any changes to placements,

and record data on support interventions in community care. The child welfare data are retrieved in electronic form and updated to the national database. The child welfare statistics have been compiled and processed by the National Institute for Health and Welfare since 1991.

In Finland, the nationwide School Health Promotion study monitors the health and well-being of Finnish adolescents. The School Health Promotion study is carried out every second year in March–April. Since 1996, comprehensive school children across 8th and 9th graders have been surveyed. For example, the questionnaire includes measures shown in table 2.

**Table 2** In 2013, the School Health Promotion study monitored pupils' health across 8th and 9th graders of comprehensive school residing in the municipalities of the Council of Oulu Region. The number gives the proportion of children who experienced that way in relation to all those who responded to the survey (Sotkanet, Institute for Health and Welfare).

Measure	2013 %
Inadequate parenting (ind. 284)	17,6
In moderate or poor health (ind. 286)	16,2
Moderate or severe anxiety (ind. 328)	11,1
Difficult to talk to parents (ind. 329)	8,6
Teachers are not interested in how the pupil is doing (ind. 355)	58,0

The data are gathered by an anonymous and voluntary classroom-administered questionnaire. The questionnaire is continuously being developed. Still, most of the questions have remained the same for almost 20 years, so as to maintain comparability.

### ***The child welfare notifications***

The measurement gives the number of child welfare notifications filed during a calendar year. The notification is filed in a municipal unit responsible for civic social services. According to the Finnish Child Welfare Act, a child welfare notification is made if one notices or is informed of circumstances relating to the care and upbringing of a child that give rise to a need to assess the need for child welfare measures. It can be made by phone, in writing or by visiting the municipal office in person.

### ***The child welfare interventions in community care***

The measure gives the numbers of children receiving support as a community-based child welfare intervention during a calendar year. For example, the support intervention in community care comprises support for accommodation, livelihood, school attendance and hobbies of the child. The measure also includes children receiving support in community care before a placement. Before a child is placed outside the home, it is necessary to investigate what opportunities there are for the child to live with relatives or with other persons close to the child.

### ***The placements outside the home***

The measure gives the number of children who have been placed outside the home during a calendar year. The measure includes counts of children placed outside the home as a child welfare intervention in community care, counts of emergency placements of children, counts of children taken into care involuntarily and counts of children who receive after-care outside the home. Causes behind the placements outside the home can be related to parents, as well as to children. Substance use is often an underlying factor.

### ***The referrals to child and young person psychiatric clinics***

Oulu University Hospital provides treatment for the children in the Northern Ostrobothnia Hospital District and northern Finland. Referrals to the hospital are written with the intention that the patient will be assessed and treated in before responsibility is transferred back to the referring health professional or

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3 general practitioner. Any hospital that receives referrals will need to capture information about these  
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5 patients.  
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### 8 ***Home help***

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10 The data are collected by Statistics Finland from all municipalities annually by mid-February following the  
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12 statistical year. The data on the activities and the volume of social services produced and purchased by  
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14 municipalities are primarily collected with a web collection form through a data collection service. The  
15  
16 conventional paper form is also available in case it is not possible to use the web form. From 2016 onward,  
17  
18 this data collection will be transferred to the National Institute for Health and Welfare.  
19

### 20 ***The LTC discussion and network meeting data***

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22 In each local unit, each professional keeps a record of LTC discussions held. Furthermore, each professional  
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24 who convenes a LTC network meeting will keep a record. After each calendar year, all the Local  
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26 Management Teams who have passed the community engagement phase are contacted by email and web  
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28 survey form. The aggregated counts of LTC services are reported on each municipal child and family service  
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30 sector. Data collection is coordinated by the office of Primary Health Care Unit of the Northern  
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32 Ostorobothnia Hospital District.  
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### 41 ***Effect-measure modification***

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43 ***Home help rate, recipient families with children*** is a measure of yearly rate of families with children  
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45 receiving home help by the municipal welfare services. The denominator is the number of households with  
46  
47 at least one person aged under 18 in the same year (Statistics Finland). Home help includes for example  
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49 assistance with activities related to personal care, child care and other daily activities of families. The data  
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51 cover the services funded by municipalities, that is, services that the municipality has produced or paid for.  
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53 The services that clients fund themselves are not included.  
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3 **LTC intervention rate** is a measure of yearly rate of children receiving LTC discussion by municipal child and  
4 family services. The denominator is the number of children in the same year.  
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8 **The classification of municipals.** The areal division by Finnish Area Research [11] reveals the differences in  
9 socioeconomic and endogenous development factors between the municipalities. It divides municipalities  
10 into four categories: urban areas (cities and towns); rural municipalities close to urban areas; core rural  
11 municipalities; and sparsely populated rural municipalities. **Urban areas** are the areas that form centers of  
12 high economic importance. In **rural municipalities close to urban areas**, residents have the chance to work  
13 in nearby towns and cities with highly diverse business life. These economically integrated rural  
14 municipalities have a high level of welfare. **Core rural municipalities** are situated close to a number of  
15 medium-large centers and most of the villages they contain are economically viable. **Sparsely populated**  
16 **rural municipalities** are characterized by long distances from municipal centers and have rapidly declining  
17 populations. To these municipalities the threat is a cycle of poor development: there are insufficient new  
18 jobs to replace the traditional jobs which are disappearing, young people move away, services disappear,  
19 and the capacity of municipalities for the economic management is low.  
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### 38 **Data analysis**

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40 By calendar year, aggregated counts of child welfare notifications, child welfare interventions and in  
41 community care and child placements outside the home will be described for each municipality. Incidence  
42 rates and proportions for each event will then be computed by dividing the yearly counts by the year-end  
43 total population. By calendar year, respectively, incidence rates and proportions of referrals to child  
44 psychiatric clinics will be described for each municipality. The LTC intervention data are calculated by  
45 dividing the number of LTC discussions by the population eligible for the intervention. Then, for each  
46 municipality, LTC intervention data collected across all study periods will be classified in four categories  
47 according to the phase of the LTC implementation: control period, training in the LTC services, first year  
48 with constant LTC discussions, second and following years with constant LTC discussions.  
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3 During the years 2014-18, altogether 500 000 person-years across the age-group 0-19 years will be  
4 followed. To summarize the relationship between LTC services and outcome variables we use descriptive  
5 contingency tables. Categorized LTC variable is tabulated for each outcome variable. The table is created to  
6 display data for any outcome measure (number of events and incidence rate) and subcategories of LTC  
7 services (control period, training in the LTC services, first year with constant LTC discussions, second and  
8 following years with constant LTC discussions). Most of the LTC services are rendered among families with  
9 school-age children. Hence, similar analyses will be performed separating data into subsamples according  
10 to age. Stratified analyses will include age-groups 0-6, 7-16 and 17- 19 years.

11  
12 For any given outcome, the regression analysis involves the group-specific incidence rates and the group-  
13 specific coverage data of LTC discussions. We will apply a log-linear model in the analysis of incidence rate-  
14 ratio estimation. The results of statistical analyses will be presented as incidence rate ratios with 90%  
15 confidence intervals and *p*-values.

## 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 **Ethics and dissemination**

35  
36  
37 The study design has been approved by the management of Oulu University Hospital according to the  
38 guidelines given by The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu,  
39 Finland. The Regional Ethics committee has stated that this study does not need ethics approval.

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42 Two rationales behind the present study design are: An adequate measurement of an individual-level LTC-  
43 intervention is difficult in real-life, because the framework of strengths and vulnerabilities is underlying  
44 both the capacity of individuals and their social and physical ecologies. In the Council of Oulu Region,  
45 furthermore, all the municipal authorities make autonomously decisions on the implementation of LTC-  
46 intervention. All data are treated and implemented according to national data security laws.

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3 All the parents are offered the opportunity to have the LTC- discussion and given a written structure of the  
4 discussion themes. When agreed they will make an appointment with the professional. In natural setting of  
5 child and family services, written human subject consent is not necessary.  
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10 This paper has outlined the Let's Talk about the Children activities at the Council of Oulu Region evaluation  
11 study design and data collection, as well as details on the implementation of the intervention. The LTC  
12 evaluation study uses a quasi-experimental trial design to evaluate the effectiveness of a community-level  
13 intervention designed to increase children's well-being. The design is suitable in cases where the  
14 intervention cannot be delivered to all intervention areas at the same time.  
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20 Strengths of the study include the number of participating municipalities and the multiple data collection  
21 stages. The implementation of the LTC intervention in local child and family services may decrease the need  
22 for highly specialized child protection and child psychiatric services in northern Finland. The results from  
23 the study will contribute to the limited research available on the effectiveness regarding the promotion of  
24 children's well-being via an intervention program using child and family services approach as a whole.  
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32 This pragmatic evaluation of a community-led intervention in real-life multi-professional setting is expected  
33 to provide information on adapting evidence-based methods for diverse municipalities. The child and  
34 family services are often renewed and directed so, that there are little, if any, resources for program  
35 evaluation and outcome monitoring. In this study, independent regional investigators work together with  
36 local professionals to assess in real life settings the association between change in local LTC-intervention  
37 rate and change in ecologic measures of children's health.  
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47 The LTC evaluation study in the Council of Oulu Region aims to expand our knowledge on the effectiveness  
48 concerning the promotion of children's health via an intervention program using a multi-sectorial approach.  
49 At the same time we are developing co-operation between researchers and practitioners. The results can  
50 be useful to both the researchers and the managers leading the local reform of public child and family  
51 services. If the LTC intervention proves to be effective, the intervention program can be distributed in  
52 Finland and in other high-income countries.  
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### List of abbreviations

LTCE = Let's Talk about Children Evaluation

LTC = Let's Talk about Children, a brief psychoeducational discussion with parents

LMT = Local Management Team

### Acknowledgements

The authors would like to thank all participating units and the professionals who participated as local managers in this study. The authors are grateful for discussions with Hannu Kallunki, Mika Niemelä, and Tytti Solantaus, who have shared their experiences from the Let's Talk about Children interventions.

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### Authors' contributions

VK and JJ obtained funding for the study. JJ further developed the intervention. VK designed the ecologic part of the study. HE and AP contributed to the study design. VK wrote this paper. All authors drafted and approved the final version of the manuscript.

### Funding

The Oulu University Hospital received circa 250,000 € funding for the implementation of LTC services from the member municipalities of the Northern Ostrobothnia Hospital District and the Council of Oulu Region (European Regional Development Fund). Furthermore, the LTCE study is funded by the Government

1  
2  
3 Research Funding of Finland. The study protocol was peer reviewed as part of the funding process by the  
4  
5 Research Committee of Oulu University Hospital catchment area. The funding body had no role in study  
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7 design, data collection, and data interpretation of written manuscript.  
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12 **Competing interests:** The authors declare that they have no competing interests.  
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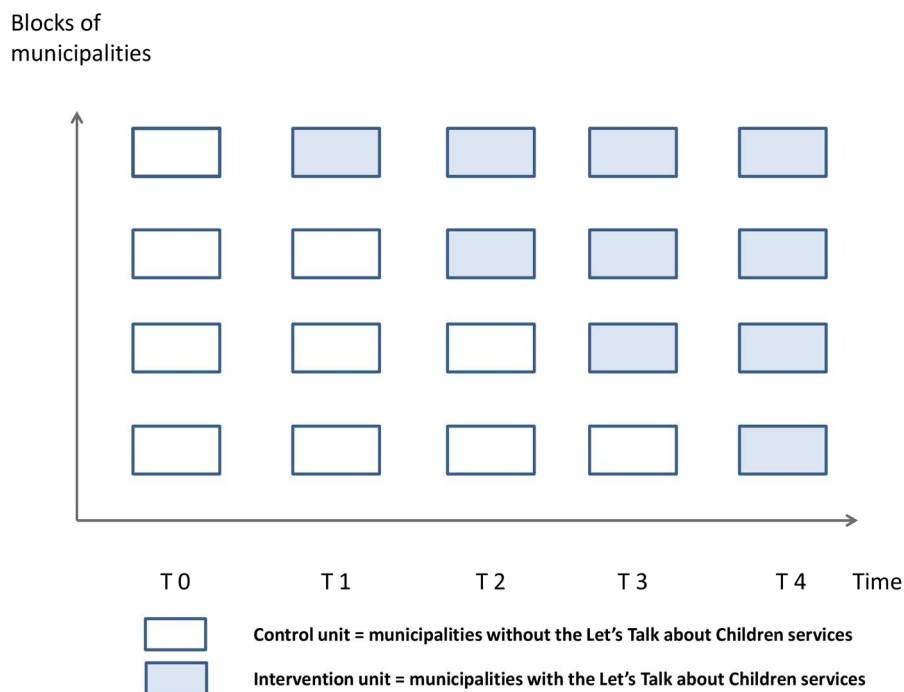
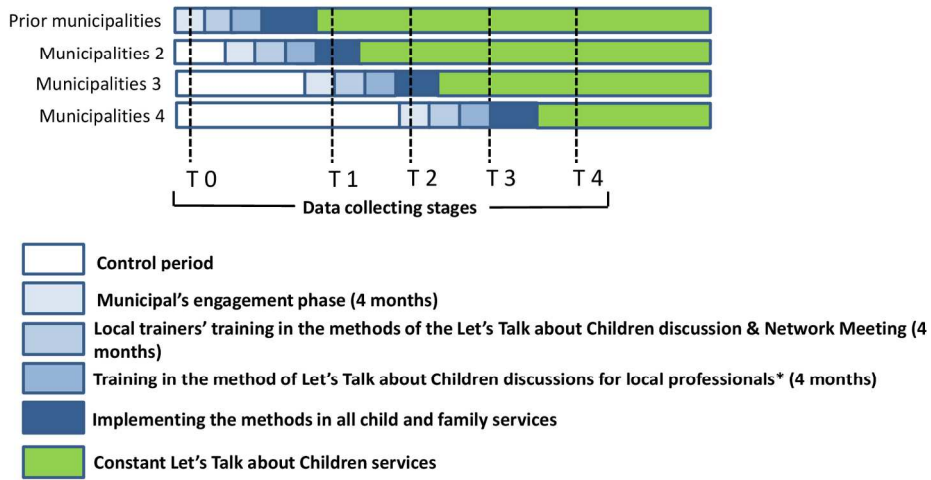


Figure 1 Design of the present study. Blocks of municipalities represent group of intervention areas. Each time period (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention) represents one time period of one block of municipalities.

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\* includes nurses and social workers, kindergarten teachers, elementary school teachers

Data collection timeline for the Let's talk about the children evaluation study

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## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-10
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	n/a
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	11
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	12-14
Bias	9	Describe any efforts to address potential sources of bias	14-15
Study size	10	Explain how the study size was arrived at	n/a
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	n/a
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	15-16

		(e) Describe any sensitivity analyses	Page
<b>Results</b>			<b>no results are shown</b>
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Ethics and dissemination</b>			
Key results	18	Summarise key results with reference to study objectives	16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17
Generalisability	21	Discuss the generalisability (external validity) of the study results	n/a
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18-19



# BMJ Open

## Let's talk about children evaluation (LTCE) study in northern Finland: A multiple group ecologic study of children's health promotion activities with a municipal and time-trend design

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-015985.R1
Article Type:	Protocol
Date Submitted by the Author:	05-Apr-2017
Complete List of Authors:	Kujala, Veikko; Oulun Yliopisto, Faculty of Medicine; Tyoterveyslaitos Jokinen, Jaana; Pohjois-Pohjanmaan Sairaanhoidopiiri, Primary Health Care Unit; Council of Oulu Region Ebeling, Hanna; Pohjois-Pohjanmaan Sairaanhoidopiiri, Department of Child Psychiatry; Oulun Yliopisto, Faculty of Medicine Pohjola, Anneli; Lapin Yliopisto, Faculty of Social Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research, Epidemiology
Keywords:	children, youth, well-being, community-level intervention, ecologic study

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Manuscripts

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3 **Revised Manuscript 4.4.2017**  
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8 **children's health promotion activities with a municipal and time-trend design**  
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## Abstract

**Introduction:** To optimise children's health and development, Finland has called for a settings approach and change of direction in child and family services. The Let's Talk about Children (LTC) approach, which consists of brief psycho-educational discussions with parents of kindergarten- and school-aged children, has been implemented in most of the Council of Oulu Region's municipalities over the past three years. This study protocol describes the Let's Talk about Children Evaluation (LTCE) Study, a community- and family-level intervention covering 30 municipalities in northern Finland; the process and the methods used to evaluate its effectiveness in improving children's socio-emotional well-being.

**Methods and analysis:** A quasi-experimental ecologic study protocol is implemented to evaluate whether universal LTC practices improve children's well-being. In each municipality, a series of measures concerning municipal engagement, training of personnel, and the LTC activity with parents are conducted in all communal child and family services. Data collection consists of annual online questionnaires for local management groups and the retrieval of information from Finland's population statistics and child welfare statistics. Child and family service data include annual numbers of LTC discussions and LTC network meetings. Outcome measures include annual child welfare notifications, interventions and placements outside the home, and referrals to child and adolescent psychiatric clinics during 2014–2018.

**Ethics and dissemination:** The study design has been approved by the management of the Oulu University Hospital in accordance with the guidelines given by The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu, Finland. All data are treated and implemented according to national data security laws. Study findings will be disseminated to provincial and municipal partners, collaborative community groups and the research and development community. The LTCE Study databases will guide future regional development action and policies.

### Strengths and limitations of this study

- The LTCE Study's protocol is suitable when intervention is implemented annually in real-life municipalities. By creating a regional database for the LTC results, we can sample over 100 000 children and youths. The merit of such large-scale evaluations is high.
- The LTC approach seeks to better link community services provided to families and to assist families in accessing the support they need.
- Adequately measuring individual-level LTC intervention results is difficult, because the framework of strengths and vulnerabilities applies to both the capacity of individuals and their social and physical ecologies.

### Introduction

Children's mental health problems disrupt healthy development and are among the leading causes of child and youth disability. [1] Opportunities exist, however, to improve mental capital through different types of intervention: we can try to build the cognitive and emotional resources that influence how an individual is able to experience a high quality of life. Some problems nevertheless extend beyond the individual to family members and communities. Thus, system-wide changes and a settings approach are needed [1, 2]. The emergence of such an approach has been attributed to the Ottawa Charters (WHO, 1986) statement which claims that health is created and lived by people within the settings of their everyday life. More research into system interventions is needed to produce an evidence base to transform child and family services.

Many evidence-based interventions fail to take an ecologic perspective for achieving a population-level impact. Children's problems may develop because of problems within their families or communities, and may include parental mental health problems, food and housing insecurity, or exposure to dangerous neighbourhoods or challenging schools [3]. Intervention may be more effective when directed at the

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3 underlying issues and designed to fit the work flow and staffing of local child and family services [3].

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5 Integration efforts in Finland involve work with school-based and public health services. Health promotion  
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7 activities are delivered in the context of co-occurring service conditions, and with a focus on both individual  
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9 and family strengths and vulnerabilities.  
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12 A strategic approach to health promotion consist of both managerial and field actions. This enables strong  
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14 systems in local child and family services, and universal delivery. Service systems are currently often  
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16 expensive in terms of duplication, inefficiency, and high procurement costs [4]. The challenges to  
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18 developing child and family services include the fragmentation of services, inter-sector borders, different  
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20 work cultures, and data transmission difficulties. Furthermore, families have a wide diversity of needs, and  
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22 varying degrees of access to assistance and advice [5].  
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26 In planning the present development programme, we used the following framework to conceptualise the  
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28 integration of child and family services. Activity integration involves the joint provision of intervention by  
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30 different sectors of services, and joint training sessions for professionals. At the regional level, policy  
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32 integration includes the development of a harmonised incentive structure for operationalising actions, and  
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34 the formation of a new partnership for municipal-based delivery of child and family services. Furthermore,  
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36 capacity-building strengthens the evaluation of health promotion activities among municipal child and  
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38 family services.  
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42 The present development programme in the Council of Oulu Region is based on elements of brief psycho-  
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44 educational discussions with parents (Let's Talk about Children, LTC) [5]. LTC was developed for the  
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46 Effective Family Program, which provided methods for health and social services to support families and  
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48 children of mentally ill parents. LTC has earlier been tested in mental health clinics to fit the real-life  
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50 settings of multi-professional child and family services [5-7]. While the LTC development work was initiated  
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52 in psychiatric services, the present programme will extend the LTC approach to all municipal child and  
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54 family services.  
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3 According to Finnish school health promotion study, most children are happy with their lives. Not all of  
4 secondary school-aged children, however, get the best possible start in life: almost 10% of children live in  
5 jobless households, 4% see their parents drunk on a weekly basis, 7% report being bullied weekly at school,  
6 and 8% have no close friends [8]. In Finland, 6% of children aged 0-17 are subject to a child welfare  
7 notification, 5% take part of a child welfare intervention, and 1% have placements outside the home.  
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14 The objective of this paper is to describe the protocol of a quasi-experimental ecologic study with a  
15 municipal group and multiple time-series design. We will evaluate the effectiveness of a community level  
16 intervention across all public child and family services in 30 municipalities in the Council of Oulu Region to  
17 promote the socio-emotional well-being of children. The intervention will identify children's needs and  
18 provide them with support in a broad spectrum of arenas in which it may be effective. The intervention is  
19 expected to produce positive aspects of child development and is impacted through changes to the  
20 children's nearest social and physical ecologies. We intend to assess the associations between change in  
21 annual coverage of LTC actions and change in different outcome measures among different age groups  
22 residing in both urban and rural municipalities. The intervention is expected to improve children's well-  
23 being after each municipality implements the LTC activities in all child and family services. We also  
24 anticipated changes in incidents of emergency placement or taking a child into care, and in incidents of new  
25 referrals to child or adolescent psychiatric units.  
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## 41 **Methods and analysis**

### 42 **Design**

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44 The present study is an ongoing quasi-experimental ecologic study, which is conducted in a naturalistic  
45 setting of public child and family services in the Council of Oulu Region, Finland. The study focuses on the  
46 population under the age of 18. We assess the ecologic association between the average LTC intervention  
47 activity and the aggregated measurement of the rate of adverse incidents among multiple groups of  
48 children. The data sources used involve observations of multiple groups based on place and time (Figure 1).  
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3 The rollout of intervention across municipalities is assigned without using randomization. In each  
4 intervention area, the selection and timing is based on the agreement between the municipal town  
5 manager and the Council of Oulu Region.  
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10 Insert Figure 1 here  
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12  
13 Since 2012, LTC services have been applied in some municipalities. The training of service suppliers in LTC  
14 intervention was first carried out in the town of Raahe. During the study, the LTC intervention will gradually  
15 be conducted in up to 30 municipalities (see participants below), and its activities will branch out year by  
16 year (Figure 2). The intervention will be fully implemented by the end of the study, and all municipalities  
17 will be involved.  
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25 Insert Figure 2 in here  
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### 30 31 **Participants**

32  
33 The “Change now. Let’s talk about the children in the Council of Oulu Region” programme is co-ordinated  
34 by the Northern Ostrobothnia Hospital District. The programme was planned at both regional and local  
35 levels within regional offices, local public sector offices, non-governmental organisations, and other  
36 regional partners. The programme co-ordinators guide the activities at the local level. At this local level, the  
37 implementers, including municipal employees and relevant community-based partners are all integrated.  
38  
39 Interventions are carried out during early childhood education in primary schools, in secondary schools,  
40 and in all health and social services.  
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48  
49 The evaluation study is conducted by the Oulu University Hospital, in close liaison with the University of  
50 Oulu and the University of Lapland. The Oulu University Hospital received circa 250 000 € funding for the  
51 implementation of LTC services from member municipalities of the Northern Ostrobothnia Hospital District  
52 and the Council of Oulu Region (European Regional Development Fund). The hospital district consists of 30  
53 distinct municipalities, of which 3 are urban (Kempele, Oulu and Raahe), 5 are rural close to urban areas (Ii,  
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Liminka, Lumijoki, Siikajoki and Tyrnävä), 10 are core rural (Haapajärvi, Haapavesi, Kalajoki, Muhos, Nivala, Oulainen, Pyhäjoki, Reisjärvi, Sievi and Ylivieska) and 12 are sparsely populated rural (Alavieska, Hailuoto, Kuusamo, Kärsämäki, Merijärvi, Pudasjärvi, Pyhäjärvi, Pyhäntä, Siikalatva, Taivalkoski, Utajärvi and Vaala). The classification of municipalities will be described further in the context of statistical analyses.

### Multiple children groups by citizenship

The complete numbers of children and young people are retrieved from the Population Statistics (Statistics Finland) and are sorted by the municipalities of the Council of Oulu Region. Population data by age group reveal the municipality's permanent resident population in each age group on the last day of the year. The multiple age groups evaluated in the study are 0–6-year-olds, and 7–16-year-olds. Table 1A presents a description of the groups and measures used in data collection.

**Table 1.** Description of study population and measures used in data collection, 2013.

Area	Population*		Child welfare actions			Home help <sup>s</sup>	Psychiatric referrals	
			Notificatio n**	Intervention ***	Placement ****		0–17 n	13–22 n
	aged 0–9 n	10–19 n	aged 0–17 n	0–17 n	0–17 n			
Alavieska	348	406	65	48	7	0		5
Haapajärvi	1020	1106	132	190	21	20	8	12
Haapavesi	976	1065	77	108	18	0	3	4
Hailuoto	80	87	19	11	0	0		1
Ii	1584	1311	161	209	7	19	11	5
Kalajoki	1647	1605	125	66	21	8	1	1
Kempele	2852	2496	428	264	32	54	19	9
Kuusamo	1649	1887	137	233	49	89	3	7
Kärsämäki	323	367	47	97	12	9	2	1
Liminka	2351	1708	248	120	10	31	11	7
Lumijoki	435	324	46	126		14		3
Merijärvi	178	179	13	8	0	0		
Muhos	1550	1361	165	127	20	52	8	9
Nivala	1803	1606	284	275	34	0	6	6
Oulainen	999	1078	164	106	19	0	6	3
Oulu	26476	23337	4822	3719	672	860	110	105
Pudasjärvi	890	1036	103	121	21	0	4	3
Pyhäjoki	408	406	64	36		6	7	
Pyhäjärvi	574	587	107	123	16	6	3	2
Pyhäntä	211	234	25	7		0		4
Raahe	3354	3183	570	321	80	60	19	12
Reisjärvi	380	404	76	59	8	9		
Sievi	952	911	122	132	13	0	1	3
Siikajoki	848	790	136	83	20	10	8	3



1									
2									
3	Siikalatva	613	677	62	74	10	0	4	5
4	Taivalkoski	438	552	46	40	17	0	2	3
5	Tyrnävä	1562	1076	156	139	9	1	3	6
6	Utajärvi	319	360	48	82	10	0	5	2
7	Vaala	254	365	117	59	17	22	7	6
8	Ylivieska	2182	1869	290	326	39	0	7	12
9		<b>57256</b>	<b>52373</b>	<b>8855</b>	<b>7309</b>	<b>1182</b>	<b>1270</b>	<b>258</b>	<b>239</b>
10	<b>Total</b>								
11									
12									
13	* Population by age group, year-end total								
14	** Number of child welfare notifications								
15	*** Number of child welfare interventions and in community care								
16	**** Number of placements outside the home.								
17	<sup>s</sup> Home help, recipient families with children								
18									
19									
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21	<b>Intervention across all the municipal child and family services</b>								
22									
23	The primary objective of the LTC intervention is to improve socio-emotional well-being among children and								
24	adolescents. We aim to promote health by making changes to modifiable risk conditions, and supportive								
25	changes through attributes that help children grow and develop successfully. At a system level, the LTC								
26	development programme also devotes resources to changing the regional child and family health								
27	promotion delivery system, building the capacity of this system to maintain LTC activities, and to catching								
28	risk conditions before they get worse. A regional steering committee has been established by the Council of								
29	Oulu Region. The committee functions as ensuring coordinated actions and development. The committee								
30	will deliberate on regional establishment issues and challenges, engage with stakeholders, review and								
31	comment on progress made and exchange of experience between the municipalities. The steering								
32	committee will provide resources and support for initiating the local activities, ultimately aiming to make								
33	LTC discussions and network meetings self-sustaining over time.								
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\* Population by age group, year-end total

\*\* Number of child welfare notifications

\*\*\* Number of child welfare interventions and in community care

\*\*\*\* Number of placements outside the home.

<sup>s</sup> Home help, recipient families with children

### Intervention across all the municipal child and family services

The primary objective of the LTC intervention is to improve socio-emotional well-being among children and adolescents. We aim to promote health by making changes to modifiable risk conditions, and supportive changes through attributes that help children grow and develop successfully. At a system level, the LTC development programme also devotes resources to changing the regional child and family health promotion delivery system, building the capacity of this system to maintain LTC activities, and to catching risk conditions before they get worse. A regional steering committee has been established by the Council of Oulu Region. The committee functions as ensuring coordinated actions and development. The committee will deliberate on regional establishment issues and challenges, engage with stakeholders, review and comment on progress made and exchange of experience between the municipalities. The steering committee will provide resources and support for initiating the local activities, ultimately aiming to make LTC discussions and network meetings self-sustaining over time.

At the local level, the intervention is implemented and co-ordinated by a Local Management Team (LMT).

The LMT includes managers of early childhood education, primary schools, health services, and social services. Each LMT is responsible for implementing the LTC approach in the child and family services of the municipality. Each must have a different LMT due to the large number of service units (kindergartens,

1  
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3 schools, health and social care centres), and because the units are spread across the whole county. No one  
4  
5 LMT is big enough to cover the whole county.  
6  
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8 Each municipality has a four-month “municipal engagement phase” prior to the local trainers’ training  
9  
10 (Figure 2). During this phase, the LMT engages in the LTC intervention activities with the elected member  
11  
12 structures, schools and other units. The trainers are then trained in LTC discussion and network meetings.  
13  
14 These training sessions are subsidised by programme resources and are free for the municipalities and for  
15  
16 the participants. The LMT co-ordinates trainers’ training by finding participants having an avid interest in  
17  
18 the subject. The LMT also advertises the LTC activities in local media (e.g., newspapers, posters and  
19  
20 leaflets). The local trainers then deliver LTC discussion training sessions to their colleagues in the municipal  
21  
22 child and family services units.  
23  
24

25  
26 Each LMT is given strategic support, as well as a clear framework and timescales for the assessment of the  
27  
28 local activities and outcomes. The Oulu University Hospital annually co-ordinates the intervention activities  
29  
30 led by the LMT, that consists of local managers. Furthermore, appropriate specialist support and mentoring  
31  
32 is provided to help the LMT in collecting data and sustaining the local units in their LTC intervention  
33  
34 activities. All the LMTs are responsible for the implementation and continuity of the universal LTC activities  
35  
36 with parents.  
37  
38

39  
40 All parents are offered the opportunity to take part in an LTC discussion and are shown the structure of the  
41  
42 discussion themes. If they agree, they make an appointment with the professional. At the family level, the  
43  
44 LTC practices includes universal LTC discussion for parents and an LTC network meeting for parents who  
45  
46 need support.  
47  
48

### 49 ***LTC practices for children’s health promotion***

#### 50 ***LTC discussion***

51  
52 This parent-focused method has been described earlier [9]. Briefly, the aim of the LTC discussion is to help  
53  
54 parents recognise their children’s strengths and vulnerabilities, and to inform them of ways in which to  
55  
56 support their children, despite possible family problems. The LTC discussion consists of one or two sessions  
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3 with the parent or both parents. The child's own teacher, nurse or social worker is also present. The LTC  
4  
5 manuals are available in Finnish on the internet for use in early childhood education, primary school,  
6  
7 secondary school and all health and social services [9].  
8  
9

10  
11 When parents bring up a problem that the family is currently facing; for example, poverty, unemployment  
12  
13 and housing problems, a further network meeting is offered. If the parents accept, the meeting is organised  
14  
15 with the partners that are expected to be able to help the family.  
16

### 17 ***LTC network meeting***

18  
19 The LTC network meeting is designed to respond to the different needs of the family on an ecologic base.  
20  
21 Depending on these needs, service representatives in addition to the family's own network are invited to  
22  
23 the meeting. The aim of the LTC network meeting is to activate all participants to provide the child and the  
24  
25 family with support. The meeting offers a joint action forum for the aid and social support required [10].  
26  
27

28  
29 LTC activities must be measured in order to be implemented. In each municipality, the intervention  
30  
31 includes measures on the operational data of LTC discussions and LTC network meetings. From 2015  
32  
33 onwards, aggregated counts of LTC discussions and network meetings have been obtained from each  
34  
35 municipality of the Council of Oulu Region. We use a time-series design to compare different LTC-  
36  
37 intervention intensity among the age groups of 0–6 years and 7–16 years.  
38  
39

### 40 41 42 43 **Outcome measurement**

44  
45 We assess children's adverse outcomes on the basis of geographically and temporally defined populations.  
46  
47 Outcome measurements are averaged for the populations in each geographical or temporal unit and then  
48  
49 compared using standard statistical methods. The primary analysis compares the proportion of children  
50  
51 referred to child welfare services through LTC activities of different intensities. The proportion of children  
52  
53 referred to psychiatric clinics is also analysed. Secondary outcomes are the proportion of children who  
54  
55 report being in moderate or poor health, experience inadequate parenting, have moderate or severe  
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3 anxiety, have difficulties talking to their parents, and feel that teachers are not interested in how they are  
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5 doing.  
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### 10 11 **Data sources**

12  
13 The follow-up of child and family service development includes items on commitment made by local  
14  
15 organisations, local management groups, trainers' training and local training of personnel. Each  
16  
17 municipality has a contract in to the LTC approach together with the Council of Oulu Region. Programme  
18  
19 maintenance and sustainability includes items on how LTC activities are adopted into the regular activity of  
20  
21 all child and family services, and how LTC activities are maintained by local organisations. Problem-solving  
22  
23 ability includes how to tackle children's health issues as an activity of its own, and how participants work  
24  
25 together to plan actions.  
26  
27

28  
29 Online questionnaires are sent out by e-mail to each local management group once a year, in January, and  
30  
31 the respondents fill in the questionnaire themselves. Additional requests are made until data from each  
32  
33 participating municipality are received. Then the intervention phase (control phase, training and  
34  
35 implementing phase, and constant actions) is recorded for each municipality at baseline and after each of  
36  
37 the four following intervention periods, i.e. calendar year.  
38  
39

40  
41 In Finland, municipalities are obliged to collect and report child welfare data. Each year, they receive a data  
42  
43 request form that they must fill in within a specified time. They are instructed to log onto the Lasu-Netti  
44  
45 website and check the provided list of current placements, record any changes to placements, and record  
46  
47 data on support interventions in community care. The child welfare data are retrieved in electronic form  
48  
49 and updated on the national database. Child welfare statistics have been compiled and processed by the  
50  
51 National Institute for Health and Welfare since 1991.  
52  
53

54  
55 In Finland, the nationwide School Health Promotion study monitors the health and well-being of Finnish  
56  
57 adolescents. The School Health Promotion study is carried out every other year in March/April. Since 1996,  
58  
59  
60

the study has surveyed 8th and 9th graders (ages 14-15) in comprehensive schools. For example, the questionnaire includes the measures that are shown in Table 2.

**Table 2** In 2013, the School Health Promotion study monitored the health of 8th and 9th graders in comprehensive schools in the municipalities of the Council of Oulu Region. The number represents the proportion of children who experienced the problem in relation to all those who responded to the survey (Sotkanet, Institute for Health and Welfare).

Measure	2013 %
Inadequate parenting (ind. 284)	17.6
In moderate or poor health (ind. 286)	16.2
Moderate or severe anxiety (ind. 328)	11.1
Difficulties talking to parents (ind. 329)	8.6
Teachers not interested in how pupil is doing (ind. 355)	58.0

The data are gathered via an anonymous and voluntary classroom-administered questionnaire. Although the questionnaire is continuously being developed, most of the questions have remained the same for almost 20 years, to maintain comparability.

### ***Child welfare notifications***

The measures provides the numbers of child welfare notifications filed during a calendar year. The notification is filed in the municipal unit responsible for civic social services. According to the Finnish Child Welfare Act, a child welfare notification is when someone observes or reports circumstances relating to the care and upbringing of a child that may require an assessment regarding the need for child welfare measures. This can be made by phone, in writing or by visiting the municipal office in person.

### ***Child welfare interventions in community care***

The measures also depict the numbers of children receiving support via a community-based child welfare intervention during a calendar year: the community care support intervention comprises support for a child's accommodation, livelihood, school attendance, and hobbies. The measure also includes children receiving community care support before a placement. Before a child is placed outside the home, any opportunities for the child to live with relatives or other people they are close to must be investigated.

### ***Placements outside the home***

Finally, the measures show the numbers of children who have been placed outside the home during a calendar year. They include counts of children being placed outside the home through a child welfare intervention in community care, counts of emergency placements, counts of children taken into care involuntarily, and counts of children who receive after-care outside the home. The causes behind these placements may be related to parents or to the children themselves. Substance abuse is often an underlying factor.

### ***Referrals to child and adolescent psychiatric clinics***

Oulu University Hospital provides treatment for children in the Northern Ostrobothnia Hospital District and in northern Finland. Hospital referrals are made with the intention that the patient will be assessed and treated before responsibility is transferred back to the referring health professional or general practitioner. Any hospital that receives referrals will need to obtain information on these patients.

### ***LTC discussion and network meeting data***

In each local unit, each professional who is offering an LTC discussion keeps a record of the LTC discussions held. Furthermore, each professional who convenes an LTC network meeting also keeps a record. After each calendar year, all the LMTs that have passed the community engagement phase are contacted by email and online survey form. The aggregated counts of LTC services are reported for each municipal child and family service sector. Data collection is co-ordinated by the office of the Primary Health Care Unit of the Northern Ostrobothnia Hospital District.

### **Effect-measure modification**

***Home help rate, recipient families with children*** is the measure of the annual rate of families with children that receive home help from municipal welfare services. The denominator is the number of households with at least one person aged under 18 in the same year (Statistics Finland). Home help includes, for example, assistance with activities related to personal care, child care and other daily family activities. The data cover the services funded by municipalities, that is, services that the municipality has produced or paid for. Services funded by the clients themselves are not included.

***LTC intervention rate*** is the measure of the annual rate of children who attend an LTC discussion in municipal child and family services. The denominator is the number of children in the same year.

***Classification of municipalities.*** The areal division by Finnish Area Research [11] reveals the differences in socioeconomic and endogenous development factors of the municipalities. It divides municipalities into four categories: urban areas (cities and towns), rural municipalities close to urban areas, core rural municipalities, and sparsely populated rural municipalities. ***Urban areas*** are those that form centres of high economic importance. In ***rural municipalities close to urban areas***, residents have the option of working in nearby towns and cities with highly diverse businesses. These economically integrated rural municipalities have a high level of welfare. ***Core rural municipalities*** are situated close to several medium-to-large centres, and most of the villages they contain are economically viable. ***Sparsely populated rural***

1  
2  
3 **municipalities** are characterised by long distances from municipal centres and have rapidly declining  
4  
5 populations. These municipalities face the threat of a cycle of poor development: not enough new jobs are  
6  
7 available to replace the traditional jobs that are disappearing, young people move away, services  
8  
9 disappear, and the capacity of municipalities for economic management is low.  
10

### 11 12 13 14 15 **Data analysis**

16  
17 Each calendar year, aggregated counts of child welfare notifications, child welfare and community care  
18  
19 interventions, and child placements outside the home are described for each municipality. Incidence rates  
20  
21 and proportions for each event will then be computed by dividing the annual counts by the year-end total  
22  
23 population. Incidence rates and proportions of referrals to child psychiatric clinics are also described each  
24  
25 calendar year for each municipality. The LTC intervention data are calculated by dividing the number of LTC  
26  
27 discussions by the population eligible for the intervention. Then, for each municipality, LTC intervention  
28  
29 data collected across all study periods are classified into four categories according to the phase of the LTC  
30  
31 implementation: control period, training in LTC services, first year with constant LTC discussions, second  
32  
33 and following years with constant LTC discussions.  
34  
35

36  
37 During 2014–2018, we will follow 500 000 person-years across the age-group of 0–17 years. To summarise  
38  
39 the relationship between LTC services and outcome variables, we use descriptive contingency tables. A  
40  
41 categorised LTC variable is tabulated for each outcome variable. The table is created to display data for any  
42  
43 outcome measure (number of events and incidence rate) and subcategories of LTC services (control period,  
44  
45 training in LTC services, first year with constant LTC discussions, second and following years with constant  
46  
47 LTC discussions). Most LTC services are rendered among families with school-aged children. Hence, similar  
48  
49 analyses will be performed that separate data into subsamples according to age. Stratified analyses will  
50  
51 include age groups of 0–6 and 7–17 years.  
52  
53

54  
55 There are background differences between municipalities. To control for potential confounding, we use we  
56  
57 use adjustment for municipal categories. For any given outcome, regression analysis involves the group-  
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3 specific incidence rates and the group-specific coverage data of LTC discussions. We apply a log-linear  
4  
5 model in the analysis of incidence rate-ratio estimation. The results of statistical analyses are presented as  
6  
7 incidence rate ratios with 90% confidence intervals and *p*-values.  
8  
9

## 10 11 12 13 **Ethics and dissemination** 14

15  
16  
17 The study design has been approved by the management of Oulu University Hospital in accordance with  
18  
19 the guidelines of The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu,  
20  
21 Finland. The Regional Ethics committee concluded that this study does not require ethics approval.  
22

23  
24 The two rationales behind the present study design are: individual-level LTC intervention is difficult to  
25  
26 measure in real life, because the framework of strengths and vulnerabilities applies to both the capacity of  
27  
28 individuals and their social and physical ecologies. Moreover, in the Council of Oulu Region, all the  
29  
30 municipal authorities autonomously make decisions on the implementation of LTC interventions. All data  
31  
32 are treated and implemented according to national data security laws.  
33

34  
35 All parents are offered the opportunity to take part in an LTC discussion and are shown the structure of the  
36  
37 discussion themes. If they agree, they make an appointment with the professional. In natural settings of  
38  
39 child and family services, written consent is not necessary.  
40  
41

42  
43 This paper outlines the LTC activities of the Council of Oulu Region's evaluation study, its design and data  
44  
45 collection, and details on the implementation of the intervention. The LTC evaluation study uses a quasi-  
46  
47 experimental trial design to evaluate the effectiveness of a community-level intervention that aims to  
48  
49 improve children's well-being. This design is suitable in cases when the intervention cannot be delivered to  
50  
51 all intervention areas at the same time.  
52

53  
54 The strengths of the study include the large number of participating municipalities and the multiple data  
55  
56 collection stages. An LTC intervention in local child and family services may reduce the need for highly  
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3 specialised child protection and child psychiatric services in northern Finland. The results from the study  
4 will contribute to the limited research available on the effectiveness of promoting children's well-being via  
5 an intervention programme that uses the child and family services approach.  
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10 This pragmatic evaluation of a community-led intervention in a real-life multi-professional setting is  
11 expected to provide information on adapting evidence-based methods for diverse municipalities. Child and  
12 family services are often renewed and directed in such ways that leave little, if any, resources for  
13 programme evaluation and outcome monitoring. In this study, independent regional investigators work  
14 together with local professionals to assess, in real-life settings, the association between the change in the  
15 local LTC intervention rate and the change in ecologic measures of children's health.  
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24 The LTC evaluation study in the Council of Oulu Region aims to expand our knowledge on the effectiveness  
25 of promoting children's health via an intervention programme that uses a multi-sectorial approach. At the  
26 same time, it improves co-operation between researchers and practitioners. The results can be useful for  
27 both the researchers and the managers leading the local reform of public child and family services. If the  
28 LTC intervention proves to be effective, the intervention programme can be distributed throughout Finland,  
29 as well as in other high-income countries.  
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#### 41 **List of abbreviations**

42 LTCE = Let's Talk about Children Evaluation

43 LTC = Let's Talk about Children, a brief psychoeducational discussion with parents

44 LMT = Local Management Team  
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#### 51 **Acknowledgements**

52 The authors would like to thank all participating units and professionals who acted as local managers in this  
53 study. The authors are grateful for the discussions with Hannu Kallunki, Mika Niemelä, and Tytti Solantaus,  
54 who shared their experiences of the Let's Talk about Children interventions.  
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**Authors' contributions**

VK and JJ obtained funding for the study. JJ further developed the intervention. VK designed the ecologic part of the study. HE and AP contributed to the study design. VK wrote this paper. All authors drafted and approved the final version of the manuscript.

**Funding**

The Oulu University Hospital received circa 250000 € funding for the implementation of LTC services from the member municipalities of the Northern Ostrobothnia Hospital District and the Council of Oulu Region (European Regional Development Fund). The LTCE study is also funded by the Government Research Funding of Finland. The study protocol was peer reviewed as part of the funding process by the Research Committee of Oulu University Hospital catchment area. The funding body played no role in the study design, data collection, or the data interpretation of the written manuscript.

**Competing interests:** The authors declare that they have no competing interests.

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#### Figure legends

Figure 1 Design of present study. Blocks of municipalities represent groups of intervention areas. Each time point (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention) represents one time period for one block of municipalities.

Figure 2 Data collection timeline for the Let's talk about the children evaluation study.

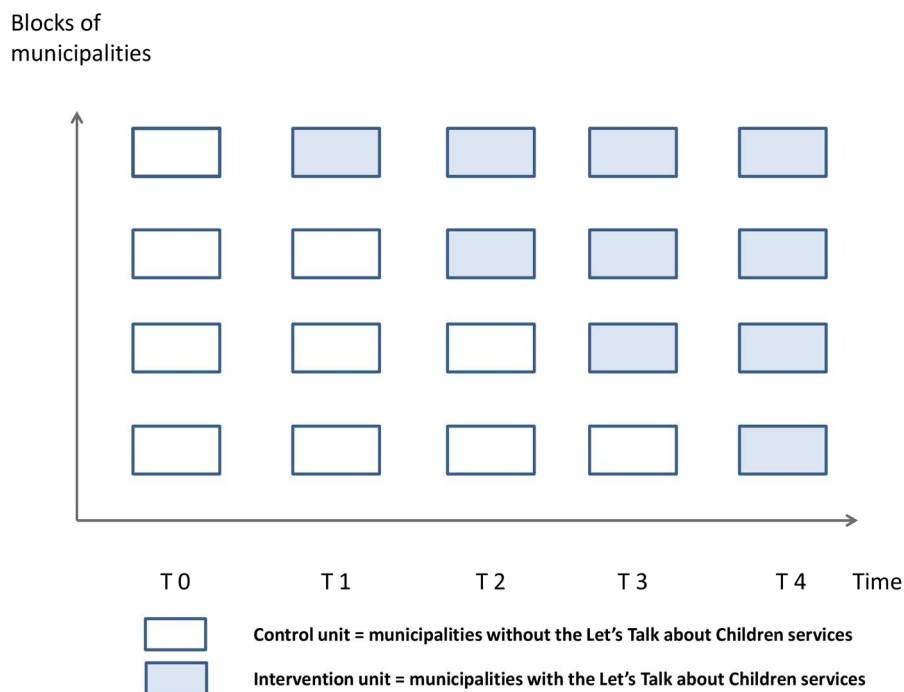


Figure 1 Design of the present study. Blocks of municipalities represent group of intervention areas. Each time period (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention) represents one time period of one block of municipalities.

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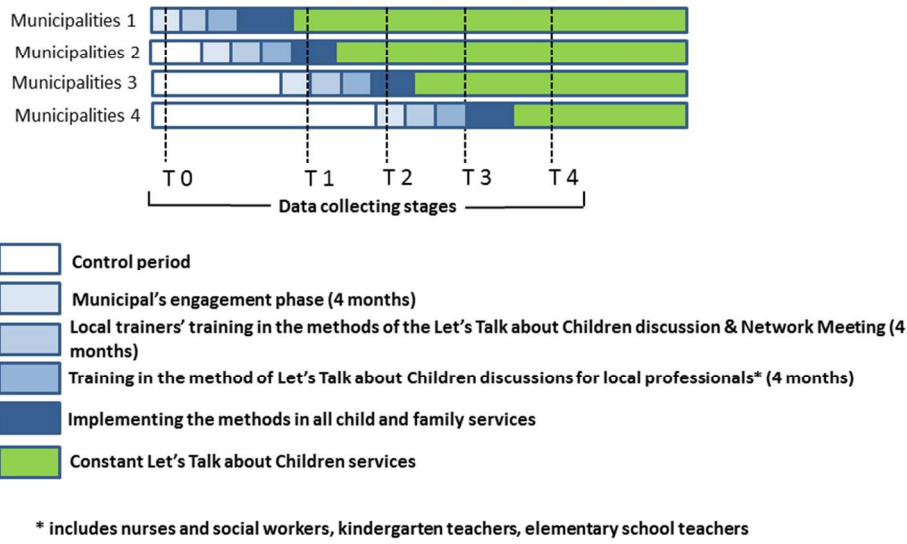


Figure 2. Data collection timeline for the Let's talk about the children evaluation study.

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## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-10
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	n/a
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	11
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	12-14
Bias	9	Describe any efforts to address potential sources of bias	14-15
Study size	10	Explain how the study size was arrived at	n/a
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	n/a
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	15-16
		(b) Describe any methods used to examine subgroups and interactions	
		(c) Explain how missing data were addressed	
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	

		(e) Describe any sensitivity analyses	Page
<b>Results</b>			<b>no results are shown</b>
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Ethics and dissemination</b>			
Key results	18	Summarise key results with reference to study objectives	16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17
Generalisability	21	Discuss the generalisability (external validity) of the study results	n/a
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18-19



# BMJ Open

## Let's talk about children evaluation (LTCE) study in northern Finland: A multiple group ecologic study of children's health promotion activities with a municipal and time-trend design

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-015985.R2
Article Type:	Protocol
Date Submitted by the Author:	05-Jun-2017
Complete List of Authors:	Kujala, Veikko; Oulun Yliopisto, Faculty of Medicine; Tyoterveyslaitos Jokinen, Jaana; Pohjois-Pohjanmaan Sairaanhoidopiiri, Primary Health Care Unit; Council of Oulu Region Ebeling, Hanna; Pohjois-Pohjanmaan Sairaanhoidopiiri, Department of Child Psychiatry; Oulun Yliopisto, Faculty of Medicine Pohjola, Anneli; Lapin Yliopisto, Faculty of Social Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research, Epidemiology
Keywords:	children, youth, well-being, community-level intervention, ecologic study

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3 **Revised Manuscript 3.6.2017**  
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6 **Let's talk about children evaluation (LTCE) study in northern Finland: A multiple group ecologic study of**  
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8 **children's health promotion activities with a municipal and time-trend design**  
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## Abstract

**Introduction:** Making change towards child and family-based and coordinated services is critical to improve quality, outcomes and value. The Let's Talk about Children (LTC) approach, which consists of brief psycho-educational discussions with parents of kindergarten- and school-aged children, has been launched as a municipality-specific program in the Council of Oulu Region. The aim of this paper is to present a protocol of an ecologic study evaluating the group-specific effects of an intervention about LTC activities in a geographically defined population. The program is designed to promote children's socio-emotional well-being.

**Methods and analysis:** A quasi-experimental ecologic study protocol is implemented to evaluate whether systematic LTC practices improve children's well-being. A multi-informant setting covers 30 municipalities in northern Finland, and involves all the municipal teachers, social and health care workers. In each municipality a Local Management Team is responsible for implementing the LTC program and collecting the annual data of LTC discussions and network meetings. The outcome data is retrieved from child welfare statistics and hospital registers. The population data, child welfare statistics and referrals to hospitals was retrieved at baseline (2014), and will be retrieved annually. Furthermore, the annual data of LTC discussions and network meetings will be collected of the years 2015-2018.

**Ethics and dissemination:** The study design has been approved by the management of the Oulu University Hospital in accordance with the guidelines given by The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu, Finland. All data are treated and implemented according to national data security laws. Study findings will be disseminated to provincial and municipal partners, collaborative community groups and the research and development community. The LTCE Study databases will guide future regional development action and policies.

### Strengths and limitations of this study

- The LTCE Study's protocol is suitable when intervention is implemented annually in real-life municipalities. By creating a regional database for the LTC results, we can sample over 100 000 children and youths. The merit of such large-scale evaluations is high.
- The LTC approach seeks to better link community services provided to families and to assist families in accessing the support they need.
- Adequately measuring individual-level LTC intervention results is difficult, because the framework of strengths and vulnerabilities applies to both the capacity of individuals and their social and physical ecologies.

### Introduction

Children's mental health problems disrupt healthy development and are among the leading causes of child and youth disability. [1] Opportunities exist, however, to improve mental capital through interventions: we can try to build the cognitive and emotional resources that influence how an individual is able to experience a high quality of life. Some problems nevertheless extend beyond the individual to family members and communities. Thus, system-wide changes and a settings approach are needed [1, 2]. The emergence of such an approach has been attributed to the Ottawa Charters (WHO, 1986) statement which claims that health is created and lived by people within the settings of their everyday life. More research into system interventions is needed to produce an evidence base to transform child and family services.

Many evidence-based interventions fail to take an ecologic perspective for achieving a population-level impact. Children's problems may develop because of problems within their families or communities, and may include parental mental health problems, food and housing insecurity, or exposure to dangerous neighbourhoods or challenging schools [3]. Intervention may be more effective when directed at the underlying issues and designed to fit the work flow and staffing of local child and family services [3].

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3 Integration efforts in Finland involve work with school-based and public health services. Health promotion  
4 activities are delivered in the context of co-occurring service conditions, and with a focus on both individual  
5 and family strengths and vulnerabilities.  
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10 A strategic approach to health promotion consist of both managerial and operational actions. This enables  
11 strong systems in local child and family services, and universal delivery. Service systems are currently often  
12 expensive in terms of duplication, inefficiency, and high procurement costs [4]. The challenges to  
13 developing child and family services include the fragmentation of services, inter-sector borders, different  
14 work cultures, and data transmission difficulties. Furthermore, families have a wide diversity of needs, and  
15 varying degrees of access to assistance and advice [5].  
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19 In planning the present development programme, we used the following framework to conceptualise the  
20 integration of child and family services. Activity integration involves the joint provision of intervention by  
21 different sectors of services, and joint training sessions for professionals. At the regional level, policy  
22 integration includes the development of a harmonised incentive structure for operationalising actions, and  
23 the formation of a new partnership for municipal-based delivery of child and family services. Furthermore,  
24 capacity-building strengthens the evaluation of health promotion activities among municipal child and  
25 family services.  
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29 The present development programme in the Council of Oulu Region is based on elements of brief psycho-  
30 educational discussions with parents (Let's Talk about Children, LTC) [5]. LTC was developed for the  
31 Effective Family Program, which provided methods for health and social services to support families and  
32 children of mentally ill parents. LTC has earlier been tested in mental health clinics to fit the real-life  
33 settings of multi-professional child and family services [5-7]. While the LTC development work was initiated  
34 in psychiatric services, the present programme will extend the LTC approach to all municipal child and  
35 family services.  
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39 According to Finnish school health promotion study, most children are happy with their lives [8]. Not all of  
40 secondary school-aged children, however, get the best possible start in life: almost 10% of children live in  
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3 jobless households, 4% see their parents drunk on a weekly basis, 7% report being bullied weekly at school,  
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5 and 8% have no close friends [8]. In Finland, 6% of children aged 0-17 are subject to a child welfare  
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7 notification, 5% take part of a child welfare intervention, and 1% have placements outside the home.  
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11 The objective of this paper is to describe the protocol of a quasi-experimental ecologic study with a  
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13 municipal group and multiple time-series design. We will evaluate the effectiveness of a community level  
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15 intervention across all public child and family services in 30 municipalities in the Council of Oulu Region to  
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17 promote the socio-emotional well-being of children. The intervention will identify children's needs and  
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19 provide them with support in a broad spectrum of arenas in which it may be effective. The intervention is  
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21 expected to produce positive aspects of child development and is impacted through changes to the  
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23 children's nearest social and physical ecologies. We intend to assess the associations between change in  
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25 annual coverage of LTC actions and change in different outcome measures among different age groups  
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27 residing in both urban and rural municipalities. The intervention is expected to improve children's well-  
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29 being after each municipality implements the LTC activities in all child and family services. We also  
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31 anticipated changes in incidents of emergency placement or taking a child into care, and in incidents of new  
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33 referrals to child or adolescent psychiatric units.  
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## 37 **Methods and analysis**

### 38 **Design**

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40 The present study is an ongoing quasi-experimental ecologic study, which is conducted in a naturalistic  
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42 setting of public child and family services in the Council of Oulu Region, Finland. The study focuses on the  
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44 population under the age of 18. We assess the ecologic association between the average LTC intervention  
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46 activity and the aggregated measurement of the rate of adverse incidents among multiple groups of  
47  
48 children. The data sources used involve observations of multiple groups based on place and time (Figure 1).  
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50 The evaluation consists of data collection at five time points (baseline and four other time points).  
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3 The rollout of intervention across municipalities is assigned without using randomization. In each  
4 intervention area, the selection and timing is based on the agreement between the municipal town  
5 manager and the Council of Oulu Region.  
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10 Insert Figure 1 here  
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12  
13 Since 2012, LTC services have been applied in some municipalities. The training of service suppliers in LTC  
14 intervention was first carried out in the town of Raahe. During the study, the LTC intervention will gradually  
15 be conducted in up to 30 municipalities (see participants below), and its activities will branch out year by  
16 year (Figure 2). The intervention will be fully implemented by the end of the study, and all municipalities  
17 will be involved.  
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25 Insert Figure 2 in here  
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### 30 31 **Participants**

32  
33 The “Change now. Let’s talk about the children in the Council of Oulu Region” programme is co-ordinated  
34 by the Northern Ostrobothnia Hospital District. The programme was planned at both regional and local  
35 levels within regional offices, local public sector offices, non-governmental organisations, and other  
36 regional partners. The programme co-ordinators guide the activities at the local level. At this local level, the  
37 implementers, including municipal employees and relevant community-based partners are all integrated.  
38  
39 Interventions are carried out during early childhood education in primary schools, in secondary schools,  
40 and in all health and social services.  
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48  
49 The evaluation study is conducted by the Oulu University Hospital, in close liaison with the University of  
50 Oulu and the University of Lapland. The Oulu University Hospital received circa 250 000 € funding for the  
51 implementation of LTC services from member municipalities of the Northern Ostrobothnia Hospital District  
52 and the Council of Oulu Region (European Regional Development Fund). The hospital district consists of 30  
53 distinct municipalities, of which 3 are urban (Kempele, Oulu and Raahe), 5 are rural close to urban areas (Ii,  
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Liminka, Lumijoki, Siikajoki and Tyrnävä), 10 are core rural (Haapajärvi, Haapavesi, Kalajoki, Muhos, Nivala, Oulainen, Pyhäjoki, Reisjärvi, Sievi and Ylivieska) and 12 are sparsely populated rural (Alavieska, Hailuoto, Kuusamo, Kärsämäki, Merijärvi, Pudasjärvi, Pyhäjärvi, Pyhäntä, Siikalatva, Taivalkoski, Utajärvi and Vaala). The classification of municipalities will be described further in the context of statistical analyses.

### Multiple children groups by citizenship

The complete numbers of children and young people are retrieved from the Population Statistics (Statistics Finland) and are sorted by the municipalities of the Council of Oulu Region. Population data by age group reveal the municipality's permanent resident population in each age group on the last day of the year. The multiple age groups evaluated in the study are 0–6-year-olds, and 7–16-year-olds. Table 1 presents a description of the groups and measures used in data collection.

**Table 1.** Description of study population and measures used in data collection, 2013.

Area	Population*		Child welfare actions			Home help <sup>s</sup>	Psychiatric referrals	
			Notificatio n**	Intervention ***	Placement ****		0–17 n	13–22 n
	aged 0–9 n	10–19 n	aged 0–17 n	0–17 n	0–17 n			
Alavieska	348	406	65	48	7	0		5
Haapajärvi	1020	1106	132	190	21	20	8	12
Haapavesi	976	1065	77	108	18	0	3	4
Hailuoto	80	87	19	11	0	0		1
Ii	1584	1311	161	209	7	19	11	5
Kalajoki	1647	1605	125	66	21	8	1	1
Kempele	2852	2496	428	264	32	54	19	9
Kuusamo	1649	1887	137	233	49	89	3	7
Kärsämäki	323	367	47	97	12	9	2	1
Liminka	2351	1708	248	120	10	31	11	7
Lumijoki	435	324	46	126		14		3
Merijärvi	178	179	13	8	0	0		
Muhos	1550	1361	165	127	20	52	8	9
Nivala	1803	1606	284	275	34	0	6	6
Oulainen	999	1078	164	106	19	0	6	3
Oulu	26476	23337	4822	3719	672	860	110	105
Pudasjärvi	890	1036	103	121	21	0	4	3
Pyhäjoki	408	406	64	36		6	7	
Pyhäjärvi	574	587	107	123	16	6	3	2
Pyhäntä	211	234	25	7		0		4
Raahe	3354	3183	570	321	80	60	19	12
Reisjärvi	380	404	76	59	8	9		
Sievi	952	911	122	132	13	0	1	3
Siikajoki	848	790	136	83	20	10	8	3



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3	Siikalatva	613	677	62	74	10	0	4	5
4	Taivalkoski	438	552	46	40	17	0	2	3
5	Tyrnävä	1562	1076	156	139	9	1	3	6
6	Utajärvi	319	360	48	82	10	0	5	2
7	Vaala	254	365	117	59	17	22	7	6
8	Ylivieska	2182	1869	290	326	39	0	7	12
9		<b>57256</b>	<b>52373</b>	<b>8855</b>	<b>7309</b>	<b>1182</b>	<b>1270</b>	<b>258</b>	<b>239</b>
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\* Population by age group, year-end total

\*\* Number of child welfare notifications

\*\*\* Number of child welfare interventions and in community care

\*\*\*\* Number of placements outside the home.

<sup>s</sup> Home help, recipient families with children

The study began in January 2014 and will be completed in December 2018. The different stages of data collection regarding both, summaries of observations derived from individuals in groups identified by citizenship (multi-group design) and by time (time-trend design), and data retrieved the national statistics (a Gantt chart shown in Figure 3). Based on data by place and time, the interpretation of estimated effects is enhanced because two types of comparisons are made simultaneously: change over time within age-groups and differences among municipalities with different phase of implementing the LTC activities in all municipal child and family services.

Insert Fig 3 in here

### Intervention across all the municipal child and family services

The primary objective of the LTC intervention is to improve socio-emotional well-being among children and adolescents. We aim to promote health by making changes to modifiable risk conditions, and supportive changes through attributes that help children grow and develop successfully. At a system level, the LTC development programme also devotes resources to changing the regional child and family health promotion delivery system, building the capacity of this system to maintain LTC activities, and to catching risk conditions before they get worse. A regional steering committee has been established by the Council of Oulu Region. The committee functions as ensuring coordinated actions and development. The committee

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2  
3 will deliberate on regional establishment issues and challenges, engage with stakeholders, review and  
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5 comment on progress made and exchange of experience between the municipalities. The steering  
6  
7 committee will provide resources and support for initiating the local activities, ultimately aiming to make  
8  
9 LTC discussions and network meetings self-sustaining over time.  
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11  
12 At the local level, the intervention is implemented and co-ordinated by a Local Management Team (LMT).  
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14 The LMT includes managers of early childhood education, primary schools, health services, and social  
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16 services. Each LMT is responsible for implementing the LTC approach in the child and family services of the  
17  
18 municipality. Each must have a different LMT due to the large number of service units (kindergartens,  
19  
20 schools, health and social care centres), and because the units are spread across the whole county. No one  
21  
22 LMT is big enough to cover the whole county.  
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26 Each municipality has a four-month “municipal engagement phase” prior to the local trainers’ training  
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28 (Figure 2). During this phase, the LMT engages in the LTC intervention activities with the elected member  
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30 structures, schools and other units. The trainers are then trained in LTC discussion and network meetings.  
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32 These training sessions are subsidised by programme resources and are free for the municipalities and for  
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34 the participants. The LMT co-ordinates trainers’ training by finding participants having an avid interest in  
35  
36 the subject. The LMT also advertises the LTC activities in local media (e.g., newspapers, posters and  
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38 leaflets). The local trainers then deliver LTC discussion training sessions to their colleagues in the municipal  
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40 child and family services units.  
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44 Each LMT is given strategic support, as well as a clear framework and timescales for the assessment of the  
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46 local activities and outcomes. The Oulu University Hospital annually co-ordinates the intervention activities  
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48 led by the LMT, that consists of local managers. Furthermore, appropriate specialist support and mentoring  
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50 is provided to help the LMT in collecting data and sustaining the local units in their LTC intervention  
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52 activities. All the LMTs are responsible for the implementation and continuity of the universal LTC activities  
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54 with parents.  
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3 All parents are offered the opportunity to take part in an LTC discussion and are shown the structure of the  
4 discussion themes. If they agree, they make an appointment with the professional. At the family level, the  
5 LTC practices includes universal LTC discussion for parents and an LTC network meeting for parents who  
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10 need support.

### 11 ***LTC practices for children's health promotion***

#### 12 ***LTC discussion***

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15 This parent-focused method has been described earlier [9]. Briefly, the aim of the LTC discussion is to help  
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This parent-focused method has been described earlier [9]. Briefly, the aim of the LTC discussion is to help  
parents recognise their children's strengths and vulnerabilities, and to inform them of ways in which to  
support their children, despite possible family problems. The LTC discussion consists of one or two sessions  
with the parent or both parents. The child's own teacher, nurse or social worker is also present. The LTC  
manuals are available in Finnish on the internet for use in early childhood education, primary school,  
secondary school and all health and social services [9].

When parents bring up a problem that the family is currently facing; for example, poverty, unemployment  
and housing problems, a further network meeting is offered. If the parents accept, the meeting is organised  
with the partners that are expected to be able to help the family.

#### 61 ***LTC network meeting***

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The LTC network meeting is designed to respond to the different needs of the family on an ecologic base.  
Depending on these needs, service representatives in addition to the family's own network are invited to  
the meeting. The aim of the LTC network meeting is to activate all participants to provide the child and the  
family with support. The meeting offers a joint action forum for the aid and social support required [10].

LTC activities must be measured in order to be implemented. In each municipality, the intervention  
includes measures on the operational data of LTC discussions and LTC network meetings. From 2015  
onwards, aggregated counts of LTC discussions and network meetings have been obtained from each  
municipality of the Council of Oulu Region. We use a time-series design to compare different LTC-  
intervention intensity among the age groups of 0–6 years and 7–16 years.

### Outcome measurement

We assess children's adverse outcomes on the basis of geographically and temporally defined populations. Outcome measurements are averaged for the populations in each geographical or temporal unit and then compared using standard statistical methods. The primary analysis compares the proportion of children referred to child welfare services through LTC activities of different intensities. The proportion of children referred to psychiatric clinics is also analysed. Secondary outcomes are the proportion of children who report being in moderate or poor health, experience inadequate parenting, have moderate or severe anxiety, have difficulties talking to their parents, and feel that teachers are not interested in how they are doing.

### Data sources

The follow-up of child and family service development includes items on commitment made by local organisations, local management groups, trainers' training and local training of personnel. Each municipality has a contract in to the LTC approach together with the Council of Oulu Region. Programme maintenance and sustainability includes items on how LTC activities are adopted into the regular activity of all child and family services, and how LTC activities are maintained by local organisations. Problem-solving ability includes how to tackle children's health issues as an activity of its own, and how participants work together to plan actions.

Online questionnaires are sent out by e-mail to each local management group once a year, in January, and the respondents fill in the questionnaire themselves. Additional requests are made until data from each participating municipality are received. Then the intervention phase (control phase, training and implementing phase, and constant actions) is recorded for each municipality at baseline and after each of the four following intervention periods, i.e. calendar year.

In Finland, municipalities are obliged to collect and report child welfare data. Each year, they receive a data request form that they must fill in within a specified time. They are instructed to log onto the Lasu-Netti website and check the provided list of current placements, record any changes to placements, and record data on support interventions in community care. The child welfare data are retrieved in electronic form and updated on the national database. Child welfare statistics have been compiled and processed by the National Institute for Health and Welfare since 1991.

In Finland, the nationwide School Health Promotion study monitors the health and well-being of Finnish adolescents. The School Health Promotion study is carried out every other year in March/April. Since 1996, the study has surveyed 8th and 9th graders (ages 14-15) in comprehensive schools. For example, the questionnaire includes the measures that are shown in Table 2.

**Table 2** In 2013, the School Health Promotion study monitored the health of 8th and 9th graders in comprehensive schools in the municipalities of the Council of Oulu Region. The number represents the proportion of children who experienced the problem in relation to all those who responded to the survey (Sotkanet, Institute for Health and Welfare).

Measure	2013 %
Inadequate parenting (ind. 284)	17.6
In moderate or poor health (ind. 286)	16.2
Moderate or severe anxiety (ind. 328)	11.1
Difficulties talking to parents (ind. 329)	8.6
Teachers not interested in how pupil is doing (ind. 355)	58.0

The data are gathered via an anonymous and voluntary classroom-administered questionnaire. Although the questionnaire is continuously being developed, most of the questions have remained the same for almost 20 years, to maintain comparability.

### ***Child welfare notifications***

The measures provides the numbers of child welfare notifications filed during a calendar year. The notification is filed in the municipal unit responsible for civic social services. According to the Finnish Child Welfare Act, a child welfare notification is when someone observes or reports circumstances relating to the care and upbringing of a child that may require an assessment regarding the need for child welfare measures. This can be made by phone, in writing or by visiting the municipal office in person.

### ***Child welfare interventions in community care***

The measures also depict the numbers of children receiving support via a community-based child welfare intervention during a calendar year: the community care support intervention comprises support for a child's accommodation, livelihood, school attendance, and hobbies. The measure also includes children receiving community care support before a placement. Before a child is placed outside the home, any opportunities for the child to live with relatives or other people they are close to must be investigated.

### ***Placements outside the home***

Finally, the measures show the numbers of children who have been placed outside the home during a calendar year. They include counts of children being placed outside the home through a child welfare intervention in community care, counts of emergency placements, counts of children taken into care involuntarily, and counts of children who receive after-care outside the home. The causes behind these placements may be related to parents or to the children themselves. Substance abuse is often an underlying factor.

### ***Referrals to child and adolescent psychiatric clinics***

Oulu University Hospital provides treatment for children in the Northern Ostrobothnia Hospital District and in northern Finland. Hospital referrals are made with the intention that the patient will be assessed and treated before responsibility is transferred back to the referring health professional or general practitioner. Any hospital that receives referrals will need to obtain information on these patients.

### ***LTC discussion and network meeting data***

In each local unit, each professional who is offering an LTC discussion keeps a record of the LTC discussions held. Furthermore, each professional who convenes an LTC network meeting also keeps a record. After each calendar year, all the LMTs that have passed the community engagement phase are contacted by email and online survey form. The aggregated counts of LTC services are reported for each municipal child and family service sector. Data collection is co-ordinated by the office of the Primary Health Care Unit of the Northern Ostrobothnia Hospital District.

### **Effect-measure modification**

***Home help rate, recipient families with children*** is the measure of the annual rate of families with children that receive home help from municipal welfare services. The denominator is the number of households with at least one person aged under 18 in the same year (Statistics Finland). Home help includes, for example, assistance with activities related to personal care, child care and other daily family activities. The data cover the services funded by municipalities, that is, services that the municipality has produced or paid for. Services funded by the clients themselves are not included.

***LTC intervention rate*** is the measure of the annual rate of children who attend an LTC discussion in municipal child and family services. The denominator is the number of children in the same year.

***Classification of municipalities.*** The areal division by Finnish Area Research [11] reveals the differences in socioeconomic and endogenous development factors of the municipalities. It divides municipalities into four categories: urban areas (cities and towns), rural municipalities close to urban areas, core rural municipalities, and sparsely populated rural municipalities. ***Urban areas*** are those that form centres of high economic importance. In ***rural municipalities close to urban areas***, residents have the option of working in nearby towns and cities with highly diverse businesses. These economically integrated rural municipalities have a high level of welfare. ***Core rural municipalities*** are situated close to several medium-to-large centres, and most of the villages they contain are economically viable. ***Sparsely populated rural***

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3 **municipalities** are characterised by long distances from municipal centres and have rapidly declining  
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5 populations. These municipalities face the threat of a cycle of poor development: not enough new jobs are  
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7 available to replace the traditional jobs that are disappearing, young people move away, services  
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9 disappear, and the capacity of municipalities for economic management is low.  
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### 11 12 13 14 15 **Data analysis**

16  
17 Each calendar year, aggregated counts of child welfare notifications, child welfare and community care  
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19 interventions, and child placements outside the home are described for each municipality. Incidence rates  
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21 and proportions for each event will then be computed by dividing the annual counts by the year-end total  
22  
23 population. Incidence rates and proportions of referrals to child psychiatric clinics are also described each  
24  
25 calendar year for each municipality. The LTC intervention data are calculated by dividing the number of LTC  
26  
27 discussions by the population eligible for the intervention. Then, for each municipality, LTC intervention  
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29 data collected across all study periods are classified into four categories according to the phase of the LTC  
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31 implementation: control period, training in LTC services, first year with constant LTC discussions, second  
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33 and following years with constant LTC discussions.  
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37 During 2014–2018, we will follow 500 000 person-years across the age-group of 0–17 years. To summarise  
38  
39 the relationship between LTC services and outcome variables, we use descriptive contingency tables. A  
40  
41 categorised LTC variable is tabulated for each outcome variable. The table is created to display data for any  
42  
43 outcome measure (number of events and incidence rate) and subcategories of LTC services (control period,  
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45 training in LTC services, first year with constant LTC discussions, second and following years with constant  
46  
47 LTC discussions). Most LTC services are rendered among families with school-aged children. Hence, similar  
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49 analyses will be performed that separate data into subsamples according to age. Stratified analyses will  
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51 include age groups of 0–6 and 7–17 years.  
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55 There are background differences between municipalities. To control for potential confounding, we use we  
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57 use adjustment for municipal categories. For any given outcome, regression analysis involves the group-  
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3 specific incidence rates and the group-specific coverage data of LTC discussions. We apply a log-linear  
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5 model in the analysis of incidence rate-ratio estimation. The results of statistical analyses are presented as  
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7 incidence rate ratios with 90% confidence intervals and *p*-values.  
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## 10 11 12 13 **Ethics and dissemination** 14

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17 The study design has been approved by the management of Oulu University Hospital in accordance with  
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19 the guidelines of The Regional Ethics Committee of the Northern Ostrobothnia Hospital District in Oulu,  
20  
21 Finland. The Regional Ethics committee concluded that this study does not require ethics approval.  
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24 The two rationales behind the present study design are: individual-level LTC intervention is difficult to  
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26 measure in real life, because the framework of strengths and vulnerabilities applies to both the capacity of  
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28 individuals and their social and physical ecologies. Moreover, in the Council of Oulu Region, all the  
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30 municipal authorities autonomously make decisions on the implementation of LTC interventions. All data  
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32 are treated and implemented according to national data security laws.  
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35 All parents are offered the opportunity to take part in an LTC discussion and are shown the structure of the  
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37 discussion themes. If they agree, they make an appointment with the professional. The need for written  
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39 consent was waived by The Regional Ethics Committee of the Northern Ostrobothnia Hospital District. This  
40  
41 study is not research stipulated in the Finnish Medical Research Act (488/1999), which only applies to  
42  
43 medical research involving intervention in the integrity of a person.  
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47 This paper outlines the LTC activities of the Council of Oulu Region's evaluation study, its design and data  
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49 collection, and details on the implementation of the intervention. The LTC evaluation study uses a quasi-  
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51 experimental trial design to evaluate the effectiveness of a community-level intervention that aims to  
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53 improve children's well-being. This design is suitable in cases when the intervention cannot be delivered to  
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55 all intervention areas at the same time.  
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3 The strengths of the study include the large number of participating municipalities and the multiple data  
4 collection stages. An LTC intervention in local child and family services may reduce the need for highly  
5 specialised child protection and child psychiatric services in northern Finland. The results from the study  
6 will contribute to the limited research available on the effectiveness of promoting children's well-being via  
7 an intervention programme that uses the child and family services approach.  
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14 This pragmatic evaluation of a community-led intervention in a real-life multi-professional setting is  
15 expected to provide information on adapting evidence-based methods for diverse municipalities. Child and  
16 family services are often renewed and directed in such ways that leave little, if any, resources for  
17 programme evaluation and outcome monitoring. In this study, independent regional investigators work  
18 together with local professionals to assess, in real-life settings, the association between the change in the  
19 local LTC intervention rate and the change in ecologic measures of children's health.  
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28 The LTC evaluation study in the Council of Oulu Region aims to expand our knowledge on the effectiveness  
29 of promoting children's health via an intervention programme that uses a multi-sectorial approach. At the  
30 same time, it improves co-operation between researchers and practitioners. The results can be useful for  
31 both the researchers and the managers leading the local reform of public child and family services. If the  
32 LTC intervention proves to be effective, the intervention programme can be distributed throughout Finland,  
33 as well as in other high-income countries.  
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#### 45 **List of abbreviations**

46 LTCE = Let's Talk about Children Evaluation

47 LTC = Let's Talk about Children, a brief psychoeducational discussion with parents

48 LMT = Local Management Team

#### 49 **Acknowledgements**

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3 The authors would like to thank all participating units and professionals who acted as local managers in this  
4 study. The authors are grateful for the discussions with Hannu Kallunki, Mika Niemelä, and Tytti Solantaus,  
5 who shared their experiences of the Let's Talk about Children interventions.  
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16  
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18  
19 4 Oulu University Hospital, Department of Child Psychiatry, Oulu, Finland.  
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### 24 25 **Authors' contributions**

26  
27 VK and JJ obtained funding for the study. JJ further developed the intervention. VK designed the ecologic  
28 part of the study. HE and AP contributed to the study design. VK wrote this paper. All authors drafted and  
29 approved the final version of the manuscript.  
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### 34 35 **Funding**

36  
37 The Oulu University Hospital received circa 250000 € funding for the implementation of LTC services from  
38 the member municipalities of the Northern Ostrobothnia Hospital District and the Council of Oulu Region  
39 (European Regional Development Fund). The LTCE study is also funded by the Government Research  
40 Funding of Finland. The study protocol was peer reviewed as part of the funding process by the Research  
41 Committee of Oulu University Hospital catchment area. The funding body played no role in the study  
42 design, data collection, or the data interpretation of the written manuscript.  
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52 **Competing interests:** The authors declare that they have no competing interests.  
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#### Figure legends

Figure 1 Design of present study. Blocks of municipalities represent groups of intervention areas. Each time point (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention) represents one time period for one block of municipalities.

Figure 2 Data collection stages for the Let's talk about the children evaluation study.

Figure 3 Gantt diagram of the Let's talk about the children evaluation study.

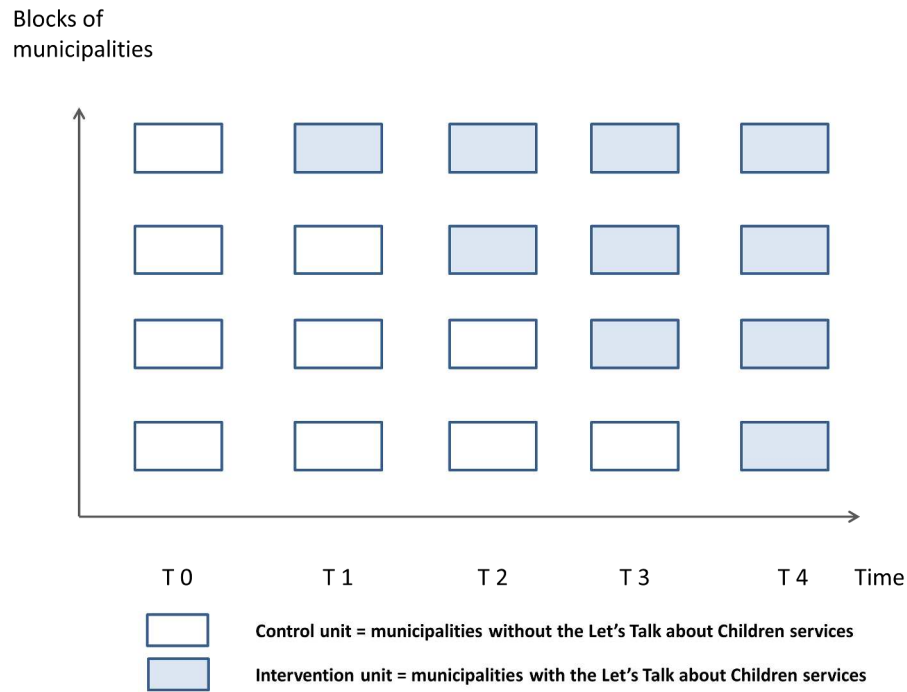


Figure 1 Design of present study. Blocks of municipalities represent groups of intervention areas. Each time point (T0, T1, T2, T3, or T4) represents a data collection point. Each unit (control or intervention) represents one time period for one block of municipalities.

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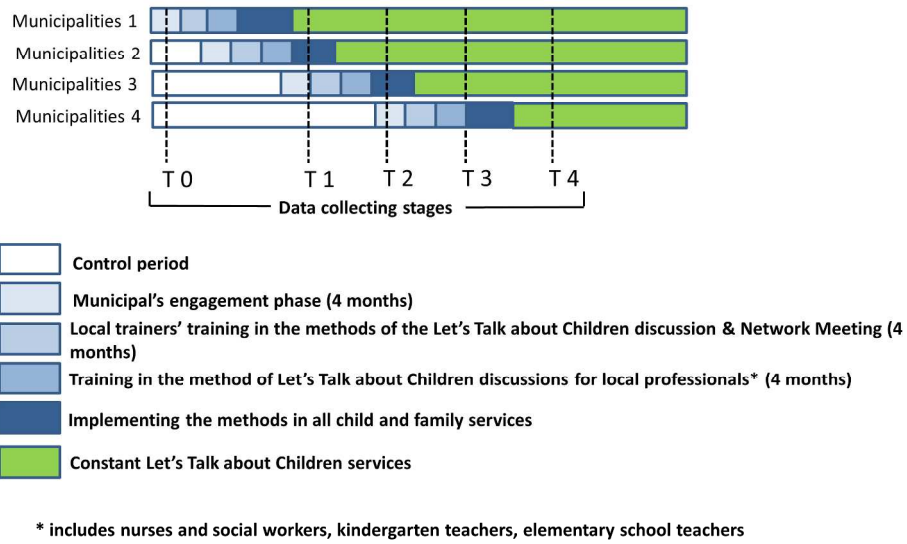


Figure 2 Data collection stages for the Let's talk about the children evaluation study.

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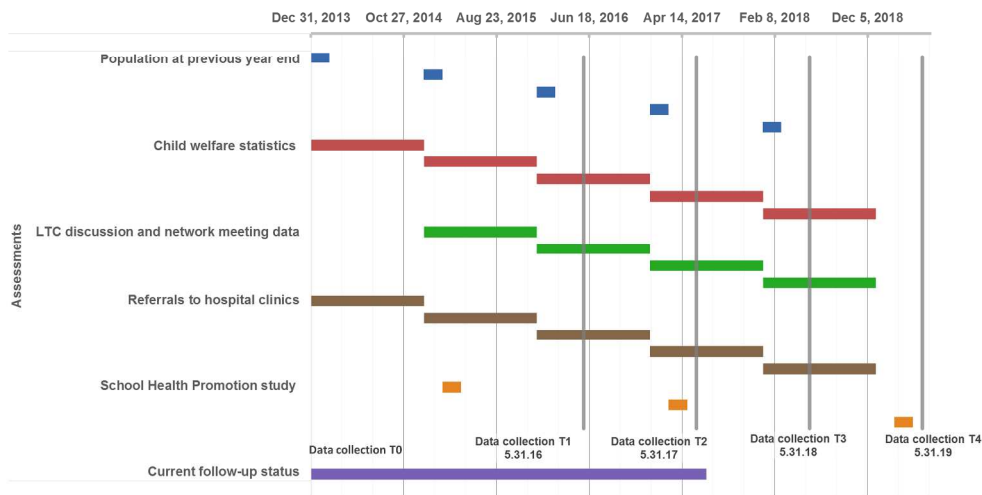


Figure 3 Gantt diagram of the Let's talk about the children evaluation study.

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## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-10
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	n/a
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	11
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	12-14
Bias	9	Describe any efforts to address potential sources of bias	14-15
Study size	10	Explain how the study size was arrived at	n/a
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	n/a
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	15-16
		(b) Describe any methods used to examine subgroups and interactions	
		(c) Explain how missing data were addressed	
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	



		(e) Describe any sensitivity analyses	Page
<b>Results</b>			<b>no results are shown</b>
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Ethics and dissemination</b>			
Key results	18	Summarise key results with reference to study objectives	16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17
Generalisability	21	Discuss the generalisability (external validity) of the study results	n/a
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18-19